Human Organization, Vol. 65, No. 3, 2006

0018-7259/06/030231-09$1.40/1

Anthropological Applications in the Management of Federally Managed Fisheries: Context, Institutional History, and Prospectus

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This special issue of *Human Organization* provides a selection of articles addressing the use of applied anthropology in fisheries management in the United States today. NOAA's National Marine Fisheries Service (NMFS)[1] has employed anthropologists and sociologists internally and externally to support fisheries management since 1974, although it used economists earlier; recent expansion of NMFS' sociocultural analysis effort is generating new initiatives and findings of interest to the wider social science community. This introduction provides the background for this issue through a brief account of past, present, and future directions of this new growth area within applied anthropology. The origins and intent of the special issue are discussed first, followed by the institutional history of the integration of anthropologists and sociologists into fisheries management at NMFS and an outline of NMFS' developing sociocultural analysis program. Finally, the specific policies and themes addressed in the individual papers are related to broader policy issues and themes within fisheries anthropology and fisheries management.

Key words: fisheries anthropology, fisheries management, United States

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Origins and Intent

This issue has been assembled in response to discussions at the Society for Applied Anthropology annual meeting in Dallas, Texas in March 2004, where several anthropologists remarked on the noticeable rise in fisheries research and the number of presentations with a fisheries focus. This reflects a rise in the number of social scientists working for NMFS or involved in contracted research. Most of the efforts of this emerging community have been reported in technical reports and Social Impact Assessments (SIAs) within large multidisciplinary documents such as Environmental Impact Statements (EISs). Discussants identified a need to communicate methods and findings with the broader applied anthropological community. The first goal was to develop a special issue of Human Organization focused on anthropological applications in the management of federally managed fisheries in the United States.

To meet this goal, we solicited papers from authors from diverse geographic and professional settings. Some authors focus on new management approaches (Olson) while others focus on the social cost of existing management measures (Allen and Gough). New methods are proposed (Sepez, Norman, Poole, and Tilt) and existing methods are expanded (Pollnac and Poggie). In some fisheries described the focus is on self-conservation efforts (Acheson) and in others restoration techniques are examined (Paolisso, Dery, and Herman). Rapid changes in coastal communities can affect marginalized fisheries (Kitner) as well as well-established fisheries (Glazier, Petterson, and Craver). The common thread among these papers is the application of

anthropological analysis to issues in federal fisheries management. As a result, analytical frameworks generally address cultural identity and the responses of individuals, households, communities and regions, a trait shared with all applied anthropologists.

Field sites covered in this series of articles extend through Maine, New Hampshire, Massachusetts, and Maryland to South Carolina on the east coast; Alaska to California on the west coast; and Hawaii. The authors contributing to this issue represent a range of anthropological and sociological practitioner settings characterized by frequent overlap and collaboration, including *federal government agencies* (Susan Abbott-Jamieson, Stewart Allen, Patricia M. Clay, Lisa L. Colburn, Karma Norman, Julia Olson, Amanda Poole, and Jennifer Sepez—all NMFS staff or contractors working within NMFS—and Amy Craver of the U.S. Fish and Wildlife Service); *quasi-governmental entities* (Kathi R. Kitner, formerly of the South Atlantic Fishery Management Council); *academia* (James M. Acheson, Nicole Dery, Amy Gough, Stan Herman, Michael Paolisso, J. Cody Petterson, John J. Poggie, Richard B. Pollnac, and Bryan Tilt); and *independent social scientist* (Edward Glazier of Impact Assessment, Inc.). Most of the federally sponsored work was conducted under the auspices of NMFS, but one paper (Glazier et al.) was sponsored by the Dept. of the Interior's Minerals Management Service, which has jurisdiction over submerged lands and sought information on potential mitigation of offshore oil and gas activities relative to fisheries.

Several themes emerged, including dependence on fishing, coastal community resiliency, and external forces of change. Federal fisheries management is faced with serious dual challenges of declining resources and rapid changes in coastal environments. The communities that depend on these marine resources are caught between efforts to conserve or restore the resources, the social and economic realities of coastal development, and the emerging effects of climate change. For many years, NMFS focused on assessing the status of living marine resources (fish and other economically useful species) to manage and conserve these resources to provide food, recreational opportunities, and economic stability in the coastal economy. This was largely an attempt to maintain a balance between what was in the ocean and what was taken through harvest. Only recently has this effort expanded to recognize that many additional forces are at work (e.g., environmental degradation, world ocean climate change, changing social and economic conditions in fishing communities from non-fisheries sources, and competing uses of ocean space) that influence the availability of fishery resources and the communities that depend on them. These articles examine factors that precipitate cultural and economic transformation in fishing dependent communities by looking at the transformation of the relationship between cultural identity and the natural environment as affected by complex forces such as economic globalization and ecological health. To place these papers in context, we first briefly outline the history of efforts within NMFS to address the sociocultural context in fisheries management, and then identify some critical issues in fisheries anthropology.

The Institutional Context of Federal Marine Fisheries Management: An Historical Overview

NMFS is the contemporary descendent of the United States Commission of Fish and Fisheries—later called the Bureau of Commercial Fisheries, which was established in 1871 to protect, study, manage, and restore the nation's fishery resources. NOAA was established in 1970 and directed to improve our understanding of the nation's living marine resources, the environment in which they are found, and the interaction between the two. At that time, the Bureau of Commercial Fisheries was renamed the National Marine Fisheries Service and transferred to NOAA where it remains today. By 1971, NMFS had largely attained its current organizational structure (Hobart 1995).[2]

Federal agencies operate under legislative mandates. Amid mounting public concern and outspoken calls to keep foreigners from fishing U.S. national waters, the Fishery Conservation and Management Act (FCMA, later known as MFCMA and then MSA)[3] was passed in 1976 (P.L. 94--265). As Hobart states, it was "...the first real step toward comprehensive management of marine fisheries...(It)...set up eight regional Fishery Management Councils[4] to manage the Nation's fisheries within the newly created 200-mile fishery conservation zone (FCZ[5])" (1995, pg. 38).

Although economists have been employed by the agency for many years, Dick Schaefer, a marine fisheries biologist, hired the first anthropologist, James M. Acheson, in 1974. Schaefer reasoned that the key concept adopted to guide fisheries management in the FCMA—*maximum sustainable yield* (MSY)[6]—implied that "...we would manage people—fish don't listen to you" (Schaefer interview, 6/12/2005). Schaefer, a member of the agency team working with Congress to draft the original FCMA, believed the agency needed input from economists and other social scientists, so he hired Acheson, as well as his successors, anthropologists Michael Orbach in 1976 and Raoul Andersen in 1979.[7]

During the five years from 1974 when Acheson was hired until 1979, when Andersen left the agency, the anthropologist's role evolved from research and policy creation to policy implementation, regulatory work, and other miscellanea.[8] From the beginning, agency staff—including Schaefer—had little or no understanding of what anthropologists could contribute to fisheries management, with some feeling the agency was wasting resources by hiring them. Thus began the still ongoing process to educate agency staff and leadership about the broad role of sociocultural analysis in the fisheries management process (Schaefer interview, 6/12/2005; Fricke interview, 4/27/2005).

Peter Fricke, trained as a sociologist, joined NMFS in January 1981 in a reformulation of the Andersen position, in time for reauthorization of the FCMA as MFCMA. By 1994 he had joined a diverse group of specialists working on policy issues, including management of fisheries, providing advice

on policy as requested by higher management, reviewing all Fishery Management Plans (FMPs) to recommend approval or not, and overseeing regulatory activities related to implementation of approved FMPs.[9]

During the early years of the MFCMA, sociocultural data necessary for analyzing the potential impacts of regulations was rarely available in the formats or geographic coverage needed. Under these circumstances, the phrase "*no data available*" was often written in the relevant sections of required documents. This was considered to fulfill the MFCMA National Standard 2 requirement for use of "best available data" (Sec. 301 (a)(2)). Agency budgets were tight throughout this period[10]; consequently it was easier to not gather data on the grounds that if one didn't gather it, one didn't have to put it in the document (Fricke interview, 4/27/2005).

The situation began changing in the early 1990s, after management accepted that National Environmental Policy Act (NEPA)[11] issues had to be addressed in FMPs, and a Fishery Impact Statement (FIS[12]) requirement was put into Sec. 303 (a)(9) of the MFCMA in 1991 (Fricke interview, 4/27/2005). These changes helped set the stage for future staff expansion.

Social Science Makes Inroads

Social science gained enough traction to establish itself as a recognized program within NMFS by the end of the 1990s, due to the work of a few dedicated staff social scientists. They were helped along the way by occasional legislative changes, the effect of successful lawsuits against the agency won on the basis of inadequate social and economic impact analysis (Gade et al. 2002, pp. 25-26, 29-32), some top level administrators who were beginning to appreciate the need for social science as a part of NMFS, and a Congress that was finally willing to authorize new funding for social science (Fricke interview, 4/27/2005; Gautam interview, May 2, 2005; Clay, pers. comm.).

Key events in the 1990s were the re-authorization of the MSA in 1996, which added National Standard 8 (NS8) or "the communities standard"[13], and subsequent implementation efforts; and achieving program funding in the FY 2001 budget.[14] Recurring funds are now appropriated annually for NS8 activities. These funds finance the developing sociocultural analysis section of the social science program (Gautam interview, May 2, 2005; Clay pers. comm.). NS8 states that "Conservation and management measures shall, consistent with the conservation requirements of this Act (including the prevention of overfishing and rebuilding of overfished stocks), take into account the importance of fishery resources to fishing communities in order to (A) provide for the sustained participation of such communities, and (B) to the extent practicable, minimize adverse economic impacts on such communities." These new requirements stimulated increased attention to sociocultural analysis in partnership with economic analyses.

The Current Social Science Program

NMFS' current mission is the "stewardship of living marine resources through science-based conservation and management and the promotion of healthy ecosystems" (NOAA-NMFS 2004, p. 1). The social science program focuses on developing data resources and research that support this mission. Social science data collection and research are now integrated into NMFS' strategic planning process[15].

The drivers behind tactical decisions about which data to collect and which research projects to support lie in legislative mandates like the MSA, various Executive Orders (including E.O. 12866 on environmental justice), and NMFS policy. The NMFS Strategic Plan for Fisheries Research issued in February 2004 (NOAA-NMFS, pp. 35-38) provides an overview of current emphasis in sociocultural and economic data collection and research[16]. It also lists regional sociocultural and economic research accomplishments and priorities for FY 2004-2009.

The Northeast Fisheries Science Center had had a staff anthropologist since 1993 (Clay), but the first staff hires with the new funds occurred in late 2001 when the Alaska Science Center in Seattle hired a staff anthropologist (Sepez), and the Office of Science and Technology in NMFS HQ hired a Senior Social Scientist (Abbott-Jamieson)[17]. Since then staff have been added at five of the six Fisheries Science Centers and one of the six Regional Offices who coordinate their regional efforts with headquarters staff.

An important early effort has been drafting a *Sociocultural Practitioners Manual* to clarify agency sociocultural analysis requirements under the Operational Guidelines[18], and to provide practical advice on carrying out those requirements. The manual's preparation is also providing a vehicle for gaining internal consensus on a set of data elements and indicators, and a methodology for identifying MSA fishing communities for NS8 purposes (Clay & Abbott-Jamieson n.d.). The subset of MSA fishing communities requires more detailed social impact assessment when new management actions are being considered than does the full set of communities involved in fishing. Diverse social science expertise is being sought throughout this effort. The draft manual also triggered regional community profiling efforts where none had existed before and revision of existing profiles. Completing the first round of community short form profiles based on existing data[19] dominates current regional social science efforts.

Other research includes ongoing studies of crew in Alaska, the Southeast, and the Pacific Islands. The Northeast has begun collecting oral histories of women in fisheries. An HQ outreach project is the Local Fisheries Knowledge Pilot Project (Isé and Abbott-Jamieson 2005).

Social impact assessment has a long history (Finsterbusch and Freudenberg 2002:408), and NMFS staff, particularly Peter Fricke, have worked for over twenty years with social scientists in other federal agencies and academia to develop SIA approaches (NOAA-NMFS 1994, 2001; ICPGSIA 2003; see also footnote 18). Experienced fisheries social scientists

have noted the need to develop a model for fisheries social impact assessment that is more compatible with biologists' and economists' approaches to improve its usefulness from council members' perspectives, a point given further support by Sharp and Lach (2003). This has led to another project—the creation of a conceptual model for predicting the social impacts of fishery management action alternatives using a limited set of quantitative and qualitative indicator variables (Pollnac, et al., n.d.).

We have compiled a list of the major contributors to sociocultural marine fisheries research in the U.S. since the 1970s (Table 1). The list is limited to work related to federal management issues; other contributors on international or state issues have been excluded because of space limitations. Many among those listed have contributed to federal as well as state fisheries management through contracted work and agency grants during this period, and, as already mentioned, some have been directly employed by NMFS.

The Future

The NMFS social science program is achieving results. It expects to complete the first wave of short form community profiles from existing data for the United States and its territories no later than 2008. This will be a significant accomplishment, providing systematically compiled comparative information that can be drawn on by those who prepare social and economic assessments for EISs for NEPA analyses and FISs for fishery management actions. Community profile data will be updated on an established cycle (probably every three to five years), remaining a continuous process.

Regional agency social scientists have also begun developing plans for producing "long form" community profiles for a small set of communities that represent different regional community subtypes. The long form community profiles will be based on a combination of key informant interviews, unobtrusive measures, rapid assessment techniques, and publicly available data collected by others. Ethnographic field visits to these "indicator" communities are expected to produce detail that can help with the interpretation of data trends seen across communities in the short form profiles.

Cross-regional comparative analysis of fishing community databases will be possible in the future. Agency staff are developing database architecture for this purpose. Once the community databases and the associated community profiles have been completed, topical research efforts may be expanded if funding allows. In addition to those described above, potential topics include environmental justice; community/cooperative fisheries management; Limited Access privilege programs, e.g., Individual Fishing Quotas (IFQs), Individual Transferable Quotas (ITQs), Individual Community Quotas (ICQs) and their effects on communities; and cumulative impacts[20] of management actions on local communities. What future social science research might be demanded by the recent agency adoption of ecosystems-based management is as yet unclear.

What is clear, however, is that "no available data" has become an historical artifact. Though nascent, within the NOAA family, NMFS has created the most developed social science program. Cooperative relationships with academic and independent fisheries social scientists will remain important. The continuous flow of ideas through participation in research projects, impact assessments, professional meetings, workshops, and informal visits among agency, academic, and independent fisheries social scientists has injected new energy into the field of U.S. fisheries management, with this special issue of *Human Organization* constituting one such fruitful occasion. We will continue to need broad participation in this program as the nation's fisheries change in response to a complex ecology that includes the structure, organization, and internal processes of the fishing industry itself; larger national and international social, economic, and cultural structures and processes; and changes in climate and changes in the natural environment—including fish population dynamics, ocean pollution, and other threats to habitat.

Overview of Papers

The following articles provide a sample of the work that has informed the debate within NMFS on challenges and approaches to meeting the needs for rigorous social scientific analysis of human impacts from federal fisheries management actions. Papers include basic research in social science methodology as well as more specific issue-related research. All examine, in some form, the relationships among community, household, and individual well-being as they relate to resiliency in response to regulatory pressures to protect marine resources and to other aspects of marine environmental change—including economic changes originating at regional, national, and global levels.

This is at the core of what NS8 requires of NMFS: to consider how fishing-dependent communities can adapt and sustain their engagement in marine resource harvesting and processing in the face of complex pressures. From a more purely anthropological perspective, the papers also include important discussions of the cultural nature of fishing, in particular, an examination of the enduring question that if fishing is among the most physically dangerous occupations in the United States, and is also economically threatened, why do fishermen still fish?

Acheson provides a look at two very different community responses to external pressures. His comparative analysis of the structural characteristics of lobster and groundfish fishing in northern New England uses rational choice theory to evaluate the underlying factors that contribute to quite different levels of support for conservation legislation in the lobster fishery and the groundfish fishery. He identifies several factors, and makes progress on defining conditions that may encourage resource users to develop sustainable practices and codes to maintain their livelihood.

Olson examines a case study of a single species fishery, sea scallops, that has responded to a regulatory shift from

Table 1. Major Social Scientist Contributors to U.S. Fisheries Research, 1970-2005

REGION	PRIMARY AFFILIATION				
	Current (2005) NOAA, Council, Commission; Other Federal and State Agency Staff [1]	*Key Academics 1970-2005*			*Key Independent Contractors* [2] *1970-2005*
Northeast	Deirdre Boelke (council) Patricia M. Clay (NMFS) Lisa L. Colburn (NMFS) Julia Olson (NMFS) Patricia Pinto da Silva (NMFS) Lori Steele (council) Bryan Oles (NOS)	James M. Acheson Christopher Dyer Carolyn Ellis John Gatewood David Griffith Madeleine Hall-Arber Ilene Kaplan	Sean R. Lauer Seth Macinko Bonnie J. McCay Patrick Mullen Robert Muth Michael Paolisso Craig T. Palmer	Susan B. Peterson Rob Robertson John J. Poggie, Jr. Richard B. Pollnac Kevin St. Martin M. Estellie Smith Doug Wilson	Victor Liguori Winnie Ryan David M. White John Wingard
Southeast (includes Caribbean)	Bryan Chevront (state) Palma Ingles (NMFS) Kathi Kitner (council, until Jan 2006) Brent Stoffle (NMFS)	Ben Blount John Bort Hobson Bryan Bob Ditton E. Paul Durrenberger Carlos Garcia-Quijano Nina Garfield Barbara Garrity-Blake Robert Gramling	David Griffith Marcus Hepburn Steve Jacob Jeffrey C. Johnson Shirley Laska John Maiolo Robert Lee Maril Sara Meltzoff Patrick Mullen	Michael Orbach J. Anthony Paredes Jim Sabella J. Stephen Thomas Manuel Valdés-Pizzini Priscilla Weeks David M. White George Wooddell	Michael Downs Edward Glazier Michael Jepson John Petterson
Southwest		Christopher Dewees Marc Miller	Michael Orbach Carrie Pomeroy	John Wingard	Monica Hunter Astrid Scholz John Petterson
Northwest	Jennifer Gilden (council) Karma Norman (NMFS) Suzanne Russell (NMFS)	Charlene J. Allison Daniel L. Boxberger Flaxen Conway Courtney Carothers Richard Gale	Janet C. Gilmore Sue-Ellen Jacobs Denise Lach Marc Miller	Courtland Smith Brent Steel Bryan Tilt Wayne Suttles	Michael Downs Edward Glazier Irene Martin John Petterson Astrid Scholz
Alaska	Elizabeth Andrews (state) Molly Chythlook (state) James Fall (state) Nicole Kimball (council) Christina Package (commission) Jennifer Sepez (NMFS)	Courtney Carothers John Gatewood Dolly Garza Jeffrey C. Johnson Steve Langdon	Seth Macinko J. Russ McGoodwin Marc Miller Robert Muth	Mary Pete John J. Poggie, Jr. Richard B. Pollnac Bryan Tilt	Michael Downs Edward Glazier Henry Huntington Jon Isaacs John Petterson Don Schug
Pacific Islands	Stewart Allen (NMFS) Marcia Hamilton (council)	Jeffrey C. Johnson Marc Miller	Susan B. Peterson Craig Severance		Judith R. Amesbury Michael Downs Edward Glazier Rosalind Humter-Anderson John Petterson Don Schug
National Purview	Susan Abbott-Jamieson (NMFS) Peter H. Fricke (NMFS)				

[1] We have discussed NMFS and the Councils. Other designations in this column are NOS (National Ocean Service, part of NOAA) and Commission (referencing the 3 supra-state fishery management organizations Atlantic States, Gulf States and Pacific States). Further, there are many state staff in Alaska whose work on subsistence fisheries has been important but who are not listed here as they are now retired or have left fisheries work.

[2] This column includes those who are not now nor have been academics. Academics who also operate as contractors are listed only as academics.

open-access to limited access. This classic management strategy can be implemented in a variety of ways including limiting boats permitted, catch size, days fished, and area fished. She investigates the character of property relations in a limited access fishery managed through area-based management measures. Olson argues for ethnographic investigations that capture the relationship between fishing dependent cultures and political economy, and the variety of management regimes that fall between theoretical poles such as market-based versus community-based. To predict how communities may adapt to these management measures it is critical to look closely at what actually constitutes a fishing community with its multiple interests, statuses, alliances, and relative standings, and how it responds to shifts in property relations.

Paolisso, Dery, and Herman examine an oyster restoration project that proposes a major shift from the usual fisheries management paradigm of restricting harvesting and supporting natural recovery of stocks. This project proposes to introduce non-native oysters to the tidal waters of Maryland and Virginia. While the preservation of Chesapeake Bay's communities and culture is seen as one key benefit of the proposed action, a sociocultural assessment of the risks and benefits of non-native restoration compared to restoration of native oysters is part of a broad EIS. They use a cultural model approach to evaluate the degree of consensus between different stakeholder groups relative to concerns for the restoration of Chesapeake Bay via the non-native oyster's introduction. They argue that analyzing the cultural knowledge and interests of watermen communities, as well as other stakeholders that are not part of the local community, are a necessary precursor to preserving the heritage of Chesapeake Bay communities.

Allen and Gough provide an ethnographic description of social impacts of fishing regulations at individual, household, and community levels by examining the closure of longline fishing grounds in Hawaii and the residual social impacts within the predominantly Vietnamese-American fishing fleet. The study reveals historical resiliency in the face of extreme social change that began with immigration from Vietnam to the United States at the end of the Vietnam War. Recent decreased access to fishing, however, has fragmented social cohesion and economic ties both within the Vietnamese-American community in Hawaii and between this community and those family members still living in Vietnam and elsewhere. The study illustrates the importance of social ties within multicultural settings and across physical space, including international boundaries.

Allen and Gough's attention to resiliency and job satisfaction is informed by the results of Pollnac and Poggie's work, which addresses the question of what motivates fishermen to fish despite great personal risk and sometimes marginal economic rewards. They examine the psychosocial characteristics of individuals living in Alaskan fishing communities, and measure their job satisfaction using structured survey instruments. While there are community-level policy implications for the results of this study, its greatest value lies in its contribution to our understanding of the interrelationship between the psychological antecedents that predispose people to prefer to fish for a living over other pursuits, and point out how displacement from this occupation can result in problematic well-being outcomes. The self-identity of fishermen is characterized by a high degree of adventure and risk seeking behavior, and a need for independence not found in the self-identities of those in other occupations. Pollnac and Poggie argue that this distinctive fisherman personality configuration is a product of both the environment that has formed these individuals and, they speculate, possibly genetic inheritance. Displacement from the fisherman occupation with its "innate" fit can jeopardize job satisfaction and lead to social adaptation issues. Pollnac and Poggie suggest that fishermen may resist change because the fit between their psychological profile and the needs of the fishing occupation is particularly tight.

Further evidence of the resilience and determination of fishermen to fish is presented by Glazier, Petterson, and Craver. Commercial drift gillnet fishing in Cook Inlet is risky and requires a high degree of skill to maneuver long nets from small boats in fast currents. It also directly conflicts with exploitation of rich oil resources that underlie the same waters. The drift captains are concerned that new oil exploration leases might increase risk and potentially damage the resource. Using ethnographic methods, the authors evaluate concern for potential risks identified by the fishing industry. They conclude that there is clear potential for conflict and have been working with captains to outline possible mitigation strategies, including constraints on drilling and extension of fishing seasons.

There is a clear need for refinement and/or development of methods for sociocultural analysis of fishing communities. Sepez et al. address both the issue of scale and selection of methods of analysis for baseline sociocultural information for a large geographic region. Community data gleaned from secondary sources are included as baseline information in impact assessment for all regions of the United States. This paper considers the need to develop a basic social science research program and database that covers a wide geographic area stretching from Alaska to California. This need for very wide area coverage conflicts with traditional anthropological research and methodology that are usually rooted in community or household level ethnographic studies. They propose a nested scale analytical framework that overlays community level information with macro level considerations. A series of social indicators were developed making inter community comparisons possible. In-depth ethnographic data were collected from selected communities. This has made it possible to more consistently identify fishing related sociocultural structures that may not have otherwise been identified using community-profiling methods on such a large scale.

The large-scale community profiling methods outlined by Sepez et al. contrast with Kitner's highly focused ethnographic study. Kitner presents a narrative account and analysis of the daily life of marginalized fishermen on the

South Atlantic coast. Her study highlights the personal costs and risks that fishermen face in this transient fishery while uncovering further evidence of the psychosocial characteristics that drive participation in the industry. She describes a "vicious circle" where fishermen go home to escape the rigors of life at sea, feel uncomfortable and soon return to the docks or vessels to continue fishing, only to long for home once again. Her account also identifies issues of infrastructure and community stability in the face of real estate development of coastal areas that lie outside the circle of agency fish stock assessment and managed access to fisheries, but nonetheless are having a profound impact on the industry and fishermen's lives in many coastal areas.

The selection of papers in this volume weaves together several common themes. It is now recognized that many fisheries throughout the world are in crisis (FAO 2005: Part 1, p.32; NOAA-NMFS 2004). As a result, some fishing communities are also in crisis—multiple factors including declining stocks, globalization effects, coastal development, climate change, and environmental degradation combine to put extraordinary stress on many fishing communities and cultures (Acheson, Allen and Gough, Glazier et al., Kitner, Paolisso et al., Pollnac and Poggie). A large part of the role of social science in fisheries management is to evaluate and predict the response of communities to change induced by management efforts and external forces (Glazier et al., Olson, Sepez et al.). This role raises a number of key questions related to the culture of fishing communities. Do participants quit fishing or adapt to new conditions (Acheson, Allen and Gough, Kitner)? Can social structure and cultural identity survive either response? To fully understand the response of communities, households, and individuals it is critical to understand why fishermen continue to fish (Pollnac and Poggie) and what contributes to the resiliency of some fishing communities while others decline and even disappear.

Notes

[1]NMFS is also called NOAA Fisheries. NOAA stands for National Oceanic and Atmospheric Administration, which encompass NMFS, the Weather Service and several other agencies. See http://www.noaa.gov for an overview of NOAA's functions. (June 22, 2006)

[2]This overview is drawn from Hobart's 1995 publication and from interviews with current and former NMFS employees conducted between February and June 2005. The Hobart publication provides a useful compendium of NMFS' institutional history, some of its most significant accomplishments, and enabling legislation. The interview audio tapes and their transcriptions will eventually become public documents archived in both the Central NOAA Library in Silver Spring, MD, and in the Applied Anthropology Oral History Collection in Special Collections, University of Kentucky Libraries, Lexington, KY. Interviews have been completed with fisheries biologist Dick Schaefer, anthropologist James M. Acheson, sociologist Peter H. Fricke, and economist Amy Gautam. Anthropologist Raoul Andersen has provided a written reflection on his time at NMFS. The interviews are cited wherever used in this article.

[3]The Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA or MSA) was originally enacted as the Fishery Conservation and Management Act (FCMA) of 1976 (P.L. 94-265), and was subsequently amended or reauthorized in 1981, 1983, 1989, 1991, and 1996. Senator Magnuson's (R-WA) name was added to it in 1980 in honor of his sponsorship and active interest in its passage, after which it was commonly referred to as the MFCMA. Senator Ted Stevens' (R-AK) name was attached in 1996 because of his long-standing interest in and active support of fishery conservation and management. The 1996 reauthorization of the MFCMA was realized by passage of the Sustainable Fisheries Act (SFA) of 1996 (P.L. 104-297). It is current practice to use Magnuson-Stevens Act (MSA) to refer to the Act after 1996, including all subsequent reauthorizations. The authors use FCMA to refer to the Act between 1976 and 1980, MFCMA between 1981 and 1995, and MSA from 1996 to the present. The most current version can be found as 16 U.S.C. 1801-1883 at http://www.nefsc.noaa.gov/magact/. (June 22, 2006)

[4]The Councils are quasi-federal entities with an office and a support staff, whose members are responsible for developing Fisheries Management Plans. There are one to three Councils for each NMFS Region and council members include a set appointed by the governors of the states within the region (representatives from industry—including, e.g., the commercial harvest, processing and recreational sectors; NGOs; and other interested citizens), the NMFS Regional office director, a Coast Guard representative, and state fishery managers within a region. Councils also appoint committees of outside experts to advise them on the state of fish stocks and economic and sociocultural dimensions of each fishery that they manage. These experts or others provide impact assessments for proposed management options. See http://www.nmfs.noaa.gov/councils/. (June 22, 2006)

[5]The Fishery Conservation Zone is now most commonly referred to as the Exclusive Economic Zone (EEZ). The EEZ is the area between 3 and 200 nautical miles (n.mi.) seaward of the 48 contiguous states, Alaska, Hawaii, and US-affiliated islands except off Texas, the Florida Gulf Coast, and Puerto Rico where the EEZ extends 9-200 n.mi. It is composed of at least eight large marine ecosystems. Details can be found in the *NMFS Strategic Plan for Fisheries Research February 2004.* http://www.st.nmfs.gov/st2/index.html. (June 22, 2006)

[6]For more information on this term see: http://www.oceansatlas.com/world_fisheries_and_aquaculture/html/glos/terms/1718.htm. (June 22, 2006)

[7]Interview with Richard Schaefer, conducted by Susan Abbott-Jamieson at his home in Bethesda, MD on 6/12/2005. Acheson and Orbach both published articles and wrote reports based on their work during their careers at NMFS. Examples of this work include Acheson 1975; Orbach 1977a, 1977b; Orbach and Harper 1978; and Orbach and King 1979.

[8]Interview with Peter H. Fricke, conducted by Susan Abbott-Jamieson at NMFS HQ in Silver Spring, MD, 4/27/2005.

[9]NMFS has separated regulatory activities and functions from research since 1976-1977. This separation of functions is seen in the creation of separate Regional Offices and Fisheries Science Centers in each NMFS region. The Regional Offices concern themselves with fisheries management, dealing directly with the Councils who send regional FMPs to the Regional Office for vetting before they are forwarded up through the bureaucratic hierarchy to the Secretary of Commerce who actually approves them. The Science Centers conduct research, compile and analyze data, issue reports and so forth. They provide scientific information in support of the agency's mission. This dichotomy is also seen within headquarters, where the management–related positions held by all anthropologists and sociologists through Fricke were not until later balanced by research-related hires in the Office of Science and Technology.

[10]NOAA's marine budgets remained flat under the Reagan Administration, 1981-88, and improved only slightly in the first Bush Administration 1989-92. See Collins 1994 and Alcock 2001 on this point. Although Presidential requests for NOAA's budget increased overall during this time, the budgets for what Congressman Unsoeld called the "wet" side of the agency—Oceans, Coasts, and NMFS—were starved, dropping from 46% of the total NOAA budget to a mere 22% in the FY 1989 budget request round (Unsoeld 1993).

[11]National Environmental Policy Act, originally passed in 1969 (Pub. L. 91-190, 42 U.S.C. 4321-4347, January 1, 1970, as amended by Pub. L. 94-52, July 3, 1975, Pub. L. 94-83, August 9, 1975, and Pub. L. 97-258, § 4(b), Sept. 13, 1982), 42U.S.C. 4321-4375. See http://ceq.eh.doe.gov/nepa/nepanet.htm. (June 22, 2006)

[12]In practice, the FIS and EIS (the latter required under NEPA) are generally the same document, as many of the requirements are the same or overlap.

[13]The MSA defines a fishing community as "a community which is substantially dependent on or substantially engaged in the harvest or processing of a fishery to meet social and economic needs, and includes fishing vessel owners, operators, and crew and United States fish processors that are based in such community".

[14]See http://www.nmfs.noaa.gov/sfa/SFA-Report-FINAL7_1.pdf for an overview of implementation activities. (June 22, 2006)

[15]Research activities within NMFS are categorized into sub-types for purposes of deciding how to use available funds. *Data collection* involves bringing together information that has been compiled by others and can be used to support the agency's mission, e.g., U.S. Census data. Activities that involve generating new primary data are referred to as *research*.

[16]See http://www.st.nmfs.gov/st2/strategic_plan.html for current version. (June 22, 2006)

[17]The Senior Social Scientist helps guide the development of the program by providing national coordination and advice, organizing workshops, developing ties with academics with expertise in fisheries social science, and educating agency staff and others about the new program. Regional sociocultural staff develops their regions' sociocultural data collection and research programs in line with national guidance, identify and address any regional differences, and supervise contracts with non-agency social scientists that conduct most of the research and data collection.

[18]*NOAA-NMFS Operational Guidelines Appendix 2(g) Guidelines for Assessment of the Social Impact of Fishery Management Actions*. The 2001 version is available at http://www.st.nmfs.gov/st1/econ/cia/sia_appendix2g.pdf, (June 22, 2006) and the 2005 version will be available publicly after final approval. The National Standard Guidelines (including those for NS8) are available at http://www.st.nmfs.gov/st1/econ/cia/natstand-final.pdf. (June 22, 2006) Unlike these Guidelines, the *Sociocultural Practitioners Manual* is not itself formal NOAA Fisheries guidance on fishing community research and analyses in support of fisheries management actions, nor are the recommendations in the manual intended to be legally binding. It has gone through three revisions, and will be subject to one more before it will be available to the public.

[19]These new profiles, referred to as short-form profiles following Jennifer Sepez's practice with the Alaskan profiles, are planned to be 5-8 pages, and are largely based on archival data. Recently completed profiles for both the Alaskan Region can be accessed at http://www.afsc.noaa.gov/Quarterly/amj2004/amj04feat.pdf (June 12, 2006), and Southeast Gulf profiles can be accessed at http://sero.nmfs.noaa.gov/economics/economics.htm (June 12, 2006).

[20]See http://ceq.eh.doe.gov/nepa/ccenepa/ccenepa.htm (June 22, 2006) for a discussion of the problem of addressing cumulative impacts.

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